

REMARKS

Claims 1, 2, and 4-20 are pending.

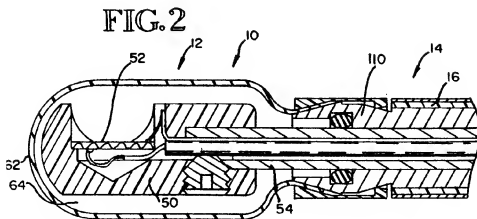
The rejection of all claims as obvious under 35 U.S.C. §103 over combinations of U.S. Patent 5,178,150 (Silverstein et al), U.S. Patent 4,007,735 (Magnusson) and U.S. Patent 6,315,710 (Bushek et al) has been maintained in the final rejection.

35 U.S.C. §103 Rejections

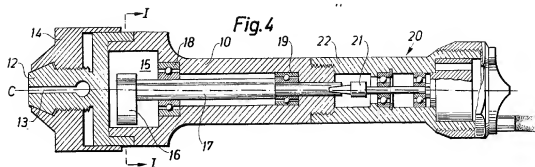
Claim 1 is rejected as obvious over Silverstein et al in view of Magnusson.

Silverstein et al describes a miniature ultrasound imaging probe which includes a probe tip 12 mounted at the distal end of a flexible catheter 14. The probe tip includes a transducer body 50 (having a rounded end 70) mounted on the distal end of a distal actuating rod 54 with the transducer body carrying an ultrasound transducer 52. A flexible bag 62 filled with an acoustic coupling fluid 64 is mounted at the distal end of the catheter 14. The bag 62 surrounds the transducer body 50 to isolate it from the external environment and retain the acoustic coupling fluid 64. When the probe is to be inserted through a narrow passage, the proximal actuating rod 54 is advanced into the catheter 14 to extend the transducer body 50 against the flexible bag 62. As a result, the bag elongates and its width is reduced. Silverstein et al Abstract and Fig. 2.

Silverstein et al Fig. 2



Magnusson describes a pneumatic cervical vibrator wherein the center of gravity of the vibrator is relatively close to the end of the holder where a pneumatic motor 20 is placed. The motor 20 drives a cam-type vibrating body 16 via a shaft 17. See Magnusson Fig. 4 reproduced below.



Claim 1 describes an ultrasonic intracavity probe for scanning a volumetric region from within the body comprising a handle section to be held during use of the probe, a shaft section having a distal end which is to be inserted into a body cavity during use of the probe, a pivottally mounted array transducer located in a rigidly dimensioned compartment at the distal end of the shaft section, a motor located in the handle section, a drive mechanism coupled to the motor and the array transducer which acts to move the array transducer during scanning, and a liquid bath constrained to the shaft section to the exclusion of the handle section and located in the compartment at the distal end of the shaft, a portion of which is located between the array transducer and the distal end of the shaft during scanning, wherein the center of gravity of the probe is located in the handle section.

It is contended that the combination of Silverstein et al in view of Magnusson teaches each limitation of Claim 1 and thus renders Claim 1 obvious. Applicant respectfully submits that the interpretation of the Silverstein et al teaching is erroneous in at least three ways, the correction of which would render Claim 1 patentable.

*The Silverstein et al and Magnusson combination fails to teach the array transducer limitation.*

Silverstein et al teach a single transducer 52 which is affixed to a body 50 which in turn is affixed to shaft 54. See Fig. 2 above. There is no suggestion within Silverstein et al that transducer 52 is or could be an array transducer.

The Examiner apparently contends that 3-dimensional imagery is a hallmark of an array transducer, and that by rotating a single transducer to create 3-dimensional or volumetric images renders that transducer an array transducer. See Pg.3 Para.2 of the Final Action. Applicant respectfully submits that the contention is incorrect. By its mere definition, an array transducer is an array of transducer elements which act in concert to obtain ultrasound images. Silverstein et al disclose no such array transducer.

Applicant further submits that Examiner's interpretation of Silverstein et al col. 4, ll. 61-66 as to the capability of a single transducer to create a three-dimensional image is incorrect. The Silverstein et al passage refers instead to an unshown position transducer, separate from the single transducer 52, which is located in the handle on the other end of the device. It is the unshown position transducer which helps to modulate a second axis of a display. The referenced "Z-axis" is actually to a displayed intensity and not to a volumetric position. Silverstein et al Col.4, l. 65-66. Silverstein et al teach no 3-dimensional or volumetric imagery at all, and thus even indirectly fail to suggest an array transducer.

*The Silverstein et al and Magnusson combination fails to teach the pivotally mounted limitation.*

Nor do Silverstein et al teach the pivotally-mounted transducer limitation. Instead, Silverstein et al teach a transducer 52 that is rigidly fixed to body 50 and shaft 54 within catheter 14. Applicant respectfully submits that the "rotating, reciprocating, or moving the catheter 14" to change the viewing position of transducer 52 does not render the transducer pivotally-mounted. See Silverstein et al Col.4 l.55-58. Applicant respectfully points out that one feature of a pivotally-mounted a transducer is that it allows for sweeping an image plane in front of the probe. Spec. Pg.4 l.25-29. There is no suggestion within Silverstein et al any such forward-looking feature.

Magnusson fails to remedy either deficiency. Magnusson teaches no transducers at all, nor does Magnusson teach any component which is pivotally-mounted.

*The Silverstein et al and Magnusson combination fails to teach the rigidly dimensioned compartment limitation.*

Claim 1 recites that the transducer is located in a rigidly dimensioned compartment at the distal end of the shaft section, and that the liquid bath is located in the compartment.

It is contended that the Silverstein et al transducer body 50 with its curved portion 70 teach the Claim 1 rigidly dimensioned compartment. Final Action Para.2 top of Pg.4. Applicant respectfully traverses.

Applicant respectfully submits that the Examiner has erred in ignoring the limitation "in" in the Claim 1 invention. Silverstein et al clearly teach that a transducer 52 resides on transducer body 50. Silverstein et al Fig. 2, 4 and Col.5, ln.49-52 (...probe tip 12 includes a transducer body 50 carrying an ultrasound transducer 52). Neither transducer 52 nor liquid

bath 64 are “in” transducer body 50, 70 by any reasonably broad interpretation of the limitation.

Magnusson fails to remedy the Silverstein et al deficiency. Magnusson teaches none of a rigidly dimensioned compartment at a distal end of a shaft section, a transducer, or a liquid bath at all.

Applicant submits therefore that Silverstein et al in view of Magnusson fail to disclose or suggest each limitation of Claim 1 as required for a finding of 35 U.S.C. §103 obviousness. Applicant respectfully requests reconsideration and allowance of Claim 1. Applicant also requests reconsideration and allowance of Claim 2 and Claims 4-20 by reason of their dependency on Claim 1.

Dependent Claim 14 is rejected as obvious over Silverstein et al in view of Magnusson and further in view of Bushek et al.

Silverstein et al and Magnusson are described above.

Bushek et al teach an ear implantable hearing assistance system which includes a vibrating auditory element and a transducer that senses or provides such mechanical vibrations. A screw and spring mechanism obtains the desired coupling force between the transducer and the auditory element.

Claim 14 further limits the Claim 1 invention by reciting a transducer cradle which is pivotally mounted to a transducer mount assembly, and wherein the transducer cradle is tapered so as to pass more easily through the liquid bath.

It is contended that the Bushek et al mount assembly teaches the Claim 14 transducer cradle. Applicant respectfully traverses.

Neither Silverstein et al nor Magnusson disclose or suggest a tapered transducer cradle at all. Silverstein et al, by teaching only a rotational motion of its transducer through a fluid bath, have no incentive for a tapered structure at all. Magnusson suggests no fluid bath at all.

Bushek et al fail to remedy the Silverstein et al and Magnusson deficiency by failing to disclose any transducer cradle which is tapered or which is pivotally mounted to a mount assembly. Contrary to the contention otherwise, Final Action Pg.6 Para.3, the recited Bushek et al passage merely discloses a fine adjustment of the hearing system transducer positioning prior to use. And because there is no liquid bath for any component to pass through, there is no incentive within Bushek et al to suggest any tapering of that component mount.

CONCLUSION

In view of the foregoing, it is respectfully submitted that Claims 1, 2, and 4-20 are patentable over any combination of Silverstein et al., Magnusson, and Bushek et al. Accordingly it is respectfully requested that the rejection of Claims 1, 2, and 4-20 under 35 U.S.C. §103(a) be withdrawn.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

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